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## CLAIMS

1           1.     A computer system, comprising:  
2                 a general purpose computer coupled to a relational database system  
3 characterized by at least one ternary vertical table, the computer including logic for  
4 undertaking method acts including:  
5                 defining a logical horizontal view over the vertical table;  
6                 receiving at least one SQL query against the horizontal view;  
7                 transforming the query to render a transformed query; and  
8                 executing the transformed query against the vertical table to generate an output.

1           2.     The system of Claim 1, wherein the query is transformed using at least one  
2 operator.

1           3.     The system of Claim 2, wherein the operator receives at least one vertical table  
2 with an associated list of attribute names as input and outputs the logical horizontal table  
3 having column labels equal to the attribute names.

1           4.     The system of Claim 3, wherein the operator is a v2h operator.

1           5.     The system of Claim 3, wherein the vertical table includes object identifications  
2 with corresponding attribute names and attribute values, and the operator executes a left outer  
3 join of a projection of distinct object identifiers of the vertical table with a sequence of left  
4 outer joins of a set of projections of attribute values from the vertical table.

1           6.     The system of Claim 1, wherein the transforming act undertaken by the  
2 computer includes executing at least one projection based on the vertical table.

1           7.     The system of Claim 1, wherein the transforming act undertaken by the  
2 computer includes executing at least one selection from the vertical table.

1           8.     The system of Claim 1, wherein the transforming act undertaken by the  
2 computer includes executing at least one table join using the vertical table.

1           9.     The system of Claim 1, wherein the transforming act undertaken by the  
2 computer includes executing at least one aggregation.

1           10.    The system of Claim 5, wherein the transforming act undertaken by the  
2 computer includes executing the operator on the vertical table to render a result and then  
3 undertaking a desired set operation on the result.

1           11.    The system of Claim 1, wherein the method acts undertaken by the computer  
2 include executing a horizontal to vertical operator against the output to transform the output to  
3 a vertical format.

1           12.    A computer program device comprising:  
2                   a computer program storage device readable by a digital processing apparatus;  
3 and  
4                   a program on the program storage device and including instructions executable  
5 by the digital processing apparatus for querying at least one vertical table in a database  
6 system, the program comprising:  
7                   computer readable code means for transforming a horizontal-based SQL query  
8 into a transformed query having a format for execution against at least one vertical table.

1           13.    The computer program device of Claim 12, further comprising:  
2                   computer readable code means for defining a logical horizontal view over the  
3 vertical table;  
4                   computer readable code means for executing the transformed query against the  
5 vertical table to generate an output.

1           14.    The computer program device of Claim 13, wherein the means for transforming  
2 includes at least relational one operator.

1           15.    The computer program device of Claim 14, wherein the operator receives at  
2 least one vertical table with an associated list of attribute names as input and outputs the  
3 logical horizontal table havrng column labels equal to the attribute names.

1           16.    The computer program device of Claim 15, wherein the operator is a v2h  
2 operator.

1           17.    The computer program device of Claim 15, wherein the vertical table includes  
2 object identifiers with corresponding attribute names and attribute values, and the operator  
3 executes a left outer join of a projection of object identifiers of the vertical table with a  
4 sequence of left outer joins of a set of projections of attribute values from the vertical table.

1           18.    The computer program device of Claim 12, wherein the means for transforming  
2 includes means for executing at least one projection based on the vertical table.

1           19.    The computer program device of Claim 12, wherein the means for transforming  
2 includes means for executing at least one selection from the vertical table.

1           20.    The computer program device of Claim 12, wherein the means for transforming  
2 includes means for executing at least one table join using the vertical table.

1           21.    The computer program device of Claim 12, wherein the means for transforming  
2 includes means for executing at least one aggregahon.

1           22.    The computer program device of Claim 17, wherein the means for transforming  
2 includes means for executing the operator on the vertical table to render a result and then  
3 undertaking a desired set operation on the result.

1           23.    The computer program device of Claim 12, further comprising means for  
2   executing a horizontal to vertical operator against an output to transform the output to a  
3   vertical format.

1           24.    A method for extracting data from at least one vertical table in a database,  
2   comprising the acts of:  
3                defining an enablement layer including at least a horizontal view representative  
4   of the vertical table; and  
5                using the enablement layer, extracting data from the database based on an SQL  
6   query without requiring a user to tailor the query to a vertical format.

1           25.    The method of Claim 24, wherein the act of extracting includes:  
2                receiving at least one SQL query against the horizontal view;  
3                transforming the query to render a transformed query; and  
4                executing the transformed query against the vertical table to generate an output.

1           26.    The method of Claim 25, wherein the query is transformed using at least one  
2   operator.

1           27.    The method of Claim 26, wherein the operator receives at least one vertical  
2   table with an associated list of attribute names as input and outputs the logical horizontal table  
3   having column labels equal to the attribute names.

1           28.    The method of Claim 27, wherein the operator is a v2h operator.

1           29.    The method of Claim 27, wherein the vertical table includes object  
2   identifications with corresponding attribute names and attribute values, and the operator  
3   executes a left outer join of a projection of distinct object identifiers of the vertical table with  
4   a sequence of left outer joins of a set of projections of attribute values from the vertical table.

1           30.    The method of Claim 25, wherein the transforming act includes executing at  
2   least one projection based on the vertical table.

1           31.    The method of Claim 25, wherein the transforming act includes executing at  
2   least one selection from the vertical table.

1           32.    The method of Claim 25, wherein the transforming act includes executing at  
2   least one table join using the vertical table.

1           33.    The method of Claim 25, wherein the transforming act includes executing at  
2   least one aggregation.

1           34.    The method of Claim 25, wherein the transforming act includes executing an  
2   operator on the vertical table to render a result and then undertaking a desired set operation on  
3   the result.

1           35.    The method of Claim 25, further comprising executing a horizontal to vertical  
2   operator against the output to transform the output to a vertical format.

1           36.    The system of Claim 1, wherein the transforming act undertaken by the  
2   computer includes executing at least one cross product based on the vertical table.

1           37.    The system of Claim 1, wherein the transforming act undertaken by the  
2   computer includes executing at least one union based on the vertical table.

1           38.    The system of Claim 1, wherein the transforming act undertaken by the  
2   computer includes executing at least one intersection based on the vertical table.